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TOOL FOR UNWRAPPING WRAPPED WIRE CONNECTIONS

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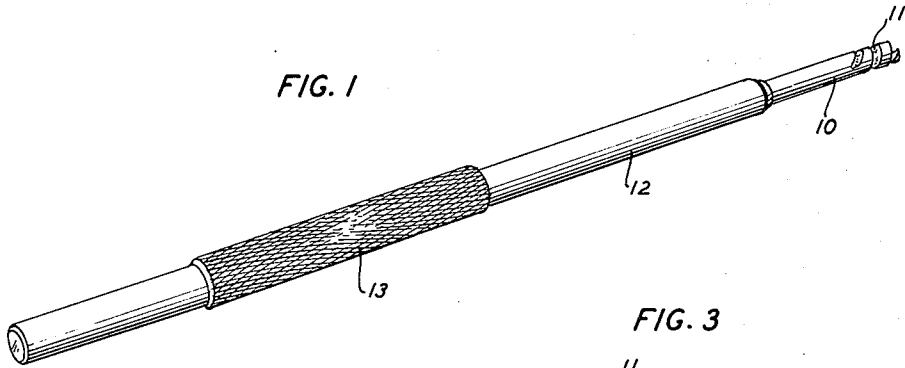


FIG. 1

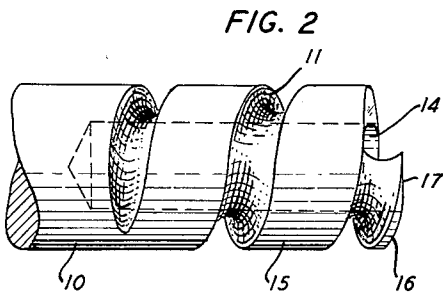


FIG. 2

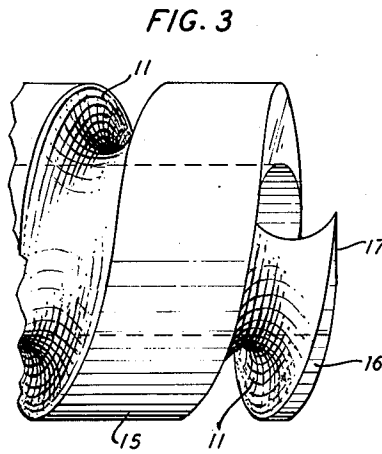


FIG. 3

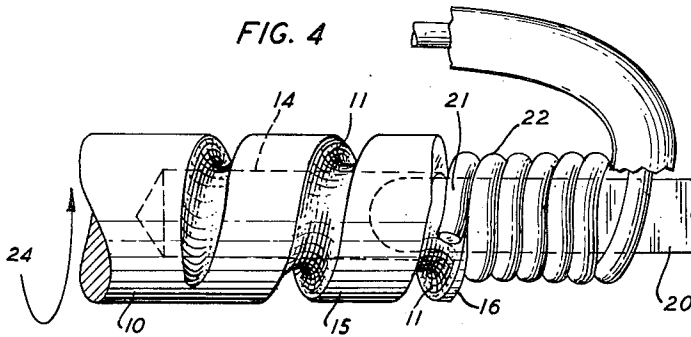


FIG. 4

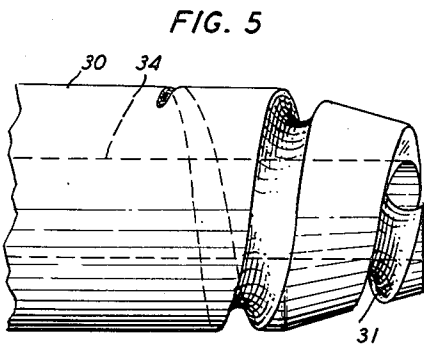


FIG. 5

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**TOOL FOR UNWRAPPING WRAPPED WIRE CONNECTIONS**

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6 Claims. (Cl. 140-123)

This invention relates to wire handling tools and more particularly to a tool for removing a wrapped wire connection from a terminal.

As set forth in Patent 2,585,010 to Hickman, Mallina and Reck, an electrical connection can be made to a suitable terminal with proper tools by wrapping a wire around the terminal. Tools such as the one disclosed in the noted patent or in applicant's Patent 2,649,121, issued August 18, 1953, will wind or wrap a connection of this type.

In connection with making repairs, alterations, etc., it often becomes necessary to remove wrapped wire connections. This may be done by bodily pulling the coil or wrapping of wire from the terminal by means of a tool having a hook or lug to go behind the coil. The operation is in the nature of wheel or gear pulling. However, since the adherence of the coiled wire to the terminal is rather tenacious in a properly wrapped connection, terminals, particularly those of small section, may be broken by such an operation.

A wrapped connection may be unwrapped by unwinding the connection wire from the terminal. For example, the end of the wire may be grasped by a suitable tool, such as a pair of pliers, and unwound. Such an operation is time-consuming and also rather difficult to perform where the terminal spacing is slight.

An object of this invention is to expedite the removal of wrapped wire connections from terminals without damaging the terminals.

A feature of this invention resides in a tool having a helically formed end for picking up and loosening successive turns of the wrapped wire so that it may be easily withdrawn from the terminal.

A more specific feature of the invention is an unwrapping tool comprising a substantially cylindrical bar or rod having an axial, terminal-receiving bore or opening in one end and a spiral or helical land defining a groove around said end.

A feature of the tool of this invention lies in the knife edge or wedge formation of the outer end of the helical land or ridge that bounds the groove, whereby said outer end may be easily inserted between the end of the wire wrapping and the adjacent turn.

A further feature of the tool of this invention resides in a small flattened area or relieved portion immediately back of the tip on the outer surface of the wedge-shaped end to avoid gouging of the wire and consequent interference with the loosening of the turns.

Other and further objects and features of this invention will appear more fully and clearly from the following description of exemplary embodiments thereof taken with the appended drawing in which:

Fig. 1 is a perspective view of an embodiment of the invention;

Fig. 2 is a view in elevation of the grooved end of the tool of Fig. 1;

Fig. 3 is a further enlarged view somewhat exaggerated to show the flat on the outside of the wedge-shaped tip;

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Fig. 4 is a view in elevation showing the tool of Fig. 2 applied to a terminal with the wedge-shaped tip inserted between the end of the coil portion of the wrapped connection and an adjacent turn thereof; and

Fig. 5 is a view similar to that of Fig. 2 of the outer end of a modified unwrapping tool.

The unwrapping tool shown in Fig. 1 is a hand tool having a reduced end portion 10 with the spiral groove 11 therein. The handle portion 12 has a knurled or otherwise roughened grip portion 13. The end portion 10 is of a diameter such that the spiral 11 is comparable in size to the coil or wrapped portion of the connection to be unwrapped. The handle portion 12 may be of somewhat greater diameter than the end portion 10 in the interest of ease of handling.

As may be seen in the enlarged view of Fig. 2, the tool is provided with an axial opening or bore 14 for receiving a terminal, such as the terminal 20 of Fig. 3.

The spiral or helical groove 11 should have a pitch greater than that of the connection to be unwrapped. Advantageously, the groove pitch is 2 to 4 times that of the wire coil or wrapping of the connection.

The ridge or land 15 between the convolutions of the groove 11 tapers to wedge form at the tip 16. The extreme end of the tip has on the outer surface a small flat area, as shown at 17 in Fig. 3. This is somewhat exaggerated in the drawing in the interest of clarity of illustration. This slight relieving of the wedge surface avoids gouging of the wire by the wedge tip and consequent jamming of the tool in some instances. For example, with very fine terminals and wire, the additional friction due to gouging may be enough to cause the tool to push the wire rather than sliding over it and to twist off the terminal. It may be noted here that the wrapped connection is ordinarily not a true helix, the turns on the flat side of a terminal being somewhat S shaped, as shown in Fig. 4. Thus the outer edge of the wedge encounters a slight depression followed by a rise in travelling over the bottom part of the S, which would increase the gouging tendency if it were not for the flat 17.

As shown in Fig. 4, the tool is applied to a wrapped connection so that the terminal 20 enters the opening 14. The tool is then rotated in the direction of the arrow 24 so that the wedge-shaped tip 16 enters the wrapping between its end 21 and the adjacent turn 22. The end 21 of the wire is directed into the groove 11 of the tool, and continued rotation of the tool loosens the whole wrapping which may then be removed.

As shown in Fig. 5, the outer end of portion 30 of the tool may be tapered, and the groove 31 may be of decreasing depth as it recedes from the tip. This construction opens up the turns of the wrapping sufficiently so that when the opening 34 is removed from the terminal after unwrapping, the wire tends to drop free from the tool. This latter-described construction may be varied by having only the taper with a groove of constant depth with reference to the taper, or only the shallowing groove with no taper. In either case the root radius of the groove will increase as the groove recedes from the tip, thus enlarging the diameter of the wrapping as it is loosened.

It is noted that the tool illustrated is used by rotation in a counterclockwise direction, as indicated by the arrow 24 in Fig. 4. If it is necessary to unwrap connections of the other hand than that shown in Fig. 4, a tool adapted for operation in a clockwise direction may be used. Such a tool could be on the other end of the handle 12, for example.

Where it is desirable to use a power drive with a tool of this type, the tool may be formed on the end of a bit adapted to be held in the chuck of a hand drill, used in place of the screwdriver bit in a power screwdriver or in

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other suitable drive means. This unwrapping tool may also be combined with a power or hand driven wrapping tool.

Various modifications may be made in this tool without departing from the spirit and scope of the invention. For example, the number of convolutions of the groove 11 or the groove 31 may be varied within reasonable limits.

What is claimed is:

1. A tool for unwrapping a wrapped wire connection from a terminal, said tool comprising an elongated bar having in one end thereof a substantially axial terminal receiving opening, and on the surface thereof and spaced from said opening a helical ridge, adjacent convolutions of which define a wire receiving groove extending to said end, the groove bounding faces of said ridge tapering to define a wedge-shaped tip at the outer end thereof, and means for rotating said bar.

2. A tool as in claim 1 in which the outer surface of the wedge-shaped tip is flattened for a short distance.

3. A tool as in claim 1 in which the outer surface of the wedge-shaped tip immediately adjacent the end thereof has a relieved portion.

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4. A tool for unwrapping a wrapped wire connection from a terminal, said tool comprising a cylindrical bar, a substantially axial terminal receiving opening in one end of said bar, and on the surface of said bar a helical ridge defining between its convolutions a helical wire receiving groove extending to said end and communicating with said opening only at said end, the groove bounding faces of said ridge tapering to define a knife edge at the outer end thereof, and means for rotating said bar.

5. A tool as in claim 4 in which the surface of the knife edge that faces said end is flattened for a short distance back from the edge.

6. A tool as in claim 4 in which the surface of the knife edge that faces said end has a relieved portion immediately adjacent the edge.

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